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the underlying principles of the phenomenon of the electric corona at high potentials."

LORD ROTHSCHILD has been elected an honorary member of the recently founded Entomological Society of Spain.

SAMUEL R. WILLIAM, professor of physics at Oberlin College, has been appointed Ernest Kempton Adams fellow by Columbia University.

SIR WILLIAM ARBUTHNOT LANE, consulting surgeon to Guy's Hospital, Sir James Mackenzie, physician to the London Hospital, and Colonel Herbert A. Bruce, consulting surgeon of the British Armies in France, are now in this country to attend American medical conferences.

MAJOR GEORGE W. NORRIS, of the University of Pennsylvania, who went to France nearly a year ago with Base Hospital No. 10, now No. 16, with the British Expeditionary forces, has been assigned, in addition to his other work, consultant in general medicine for Advance Section S. O. S., Zone of the Advance. He is attached to the American Expeditionary forces.

W. A. COCHEL, for six years head of the department of animal husbandry, Kansas State Agricultural College, has resigned his position to become secretary of the American Short-horn Breeders' Association. He will probably continue to make his home in Manhattan.

PRESIDENT W. A. JESSUP, of the University of Iowa, has received a letter from Professor C. C. Nutting, head of the expedition to the British West Indies, stating that the party had reached the island of Barbados safely after a thirteen-day voyage from New York City. Each of the nineteen members in the company is in good health, and prospects are favorable for a successful outcome. The explorers are now in government quarters and have equipped excellent laboratories and aquariums for the study of sea life.

PROFESSOR VAUGHAN MACCAUGHEY, professor of botany at the College of Hawaii, Honolulu, will have charge of the courses in biology and field natural history at the Chataqua Institution Summer Schools, Chataqua, New York. En route he will lecture at educational centers

on "The Islands of the Pacific and the World War."

SIR ALEXANDER PEDLER, F.R.S., known for his research work in chemistry, for many years professor of that science in the Presidency College at Calcutta, later vice-chancellor of the Calcutta University and minister of public instruction in Bengal, died on May 13, aged sixty-eight years.

THE death is announced in *Nature* of Dr. R. G. Hebb, consulting physician and physician pathologist to Westminster Hospital, lecturer on pathology at Westminster Hospital Medical School, reader in morbid anatomy at the University of London, and editor of the *Journal of the Royal Microscopical Society*.

THE Civil Service Commission announces a registration examination for geodetic, hydrographic and magnetic computers in the United States Coast and Geodetic Survey. This is a continuing examination and the entrance salary is \$1,200 per annum. Detailed information regarding the requirements and the work done by the computers will be furnished upon application to the U. S. Civil Service Commission or to the U. S. Coast and Geodetic Survey, Washington, D. C.

UNIVERSITY AND EDUCATIONAL NEWS

A \$50,000 BEQUEST to the University of Pennsylvania is included in the will of the late Dr. William C. Goodell, to be used to endow a chair of gynecology.

A LETTER from the department of registration and education of the state of Illinois, states that after October 15, 1918, no medical college will be recognized as in good standing in Illinois unless it requires for admission two years of work in an approved college of liberal arts or a fully equivalent education.

THE University of Wisconsin reports the receipt of gifts amounting to \$100,000 which, with an appropriation of \$50,000 from the legislature of 1917, will be used in the construction of a new infirmary for the medical school.

DR. H. L. RIETZ, of the University of Illinois, has been made head of the mathematics at the State University of Iowa. He will suc-

ceed Professor A. G. Smith, whose death occurred in the fall of 1916.

APPOINTMENTS at Cornell University have been made as follows: F. K. Richtmyer, professor of physics; John B. Bentley, jr., professor of forestry; Charles L. Gibson, professor of surgery, to succeed the late Professor Stimson; John A. Hartwell, associate professor of surgery and William C. Thro, professor of clinical pathology, Medical College, New York.

WILLIAM S. TAYLOR, acting professor of rural education at Cornell University, has been appointed professor of agricultural education at Pennsylvania State College.

DR. A. R. CUSHNY, F.R.S., professor of materia medica and pharmacology in the University of London (University College) since 1905 has been appointed to the chair of materia medica in the University of Edinburgh. Dr. Cushny was professor of pharmacology in the University of Michigan from 1893 to 1905.

DISCUSSION AND CORRESPONDENCE PYRHELIOMETRY AND SOLAR RADIATION

TO THE EDITOR OF SCIENCE: I hope it may interest your readers, and more fully explain the discrepancy between Professor Bigelow's work and mine, if you can find space for the accompanying letter.

MAY 14, 1918

My dear Professor Bigelow:

1. I received yesterday from your publishers a complimentary copy of your new book entitled "Treatise on the Sun's Radiation." You are kind to have it sent to me.

2. I received to-day your communication on a 26.68-day solar synodic period.

3. Some time ago I received some other data from you relating to observations and computations of radiation.

4. While I appreciate your kindness in remembering me personally, I am obliged to tell you that I can not at all accept your views and I do not think you either fully understand or fairly weigh our work. My reasons are partly given below.

5. Among the words you use most is "Pyreheliometer." We carefully made and standardized Silver Disk Pyreheliometer S. I. III., at your request, and sent with it an accurate description of the method by which it must be read and reduced in order to give results to correspond with its con-

stant of calibration. In your book "Atmospheric Circulation and Radiation," pages 263 to 267, I am surprised to see that you describe and *prescribe* another method of using it whereby it *can not give results agreeing with its constant of calibration.*

6. You use this word "Pyreheliometer" and its modifications often very objectionably when you mention our work. You make it appear as if we attach weight to empirical processes of extrapolation of total radiation of all wave-lengths combined. If an observer could operate on the moon, a pyreheliometer would be a very much more valuable instrument than it is here, and I believe you and others could not then avoid the true conclusions as to the value of the solar constant. Unfortunately, owing to the unequal transparency of the earth's atmosphere for rays of different wave-lengths, it is absolutely necessary to use spectrum-energy analysis to measure the solar constant of radiation, as Langley showed. We use a linear bolometer to measure the intensity and changes of intensity of all parts of the spectrum. We have employed it at Washington, Bassour, Hump Mountain, Mount Wilson, and Mount Whitney. In our experiments the solar beam traversed paths of air ranging from that where the sun was nearly vertically overhead at Mount Whitney, to that with the sun on the horizon at Mount Wilson. Anybody interested can learn exactly how we worked by studying our published papers, particularly Volumes II. and III. of our *Annals* and our paper "New Evidences on the Intensity of Solar Radiation Outside the Atmosphere," Smithsonian Miscellaneous Collections, Vol. 65, No. 4.

In all this work we treat the pyreheliometer as a subsidiary instrument. Its sole use and purpose in our investigations is to enable us to express the readings of the bolometer in calories.

As a result of spectro-bolometric investigations over fifteen years of time, we have shown that the solar constant is 1.93 calories, and the sun an irregular variable star. Others, Clayton and Bauer particularly, have shown how the solar variations we have discovered affect terrestrial things. If our results were wrong these correlations would not be found.

7. Not everybody has a spectro-bolometer. You haven't any, for one. From a wealth of experience that nobody else in the world ever had in the measurement of solar radiation, we have put out some tabular data and empirical formulæ connecting pyreheliometry and psychrometry with the solar constant. We did this, not because we had any occasion for them ourselves, but so that observers